

10.2 Part II

Quiz Friday 10.1-10.3 (no calc)
Honors Problem due Friday

ex
 $\log_{4x} 9 = 2$

$$\sqrt{(4x)^2} = \sqrt{9}$$

$$4x = \pm 3$$

$$x = \pm \frac{3}{4}$$

Base must be positive

$$x = \frac{3}{4}$$

Inequalities

If $b > 1$, $x > 0$

and $\log_b x > y$, then $x < b^y$

Switching
Symbols

and $\log_b x < y$, then $x > b^y$

Ex

$$\log_8 x < 2$$

$$8^2 > x$$

$$0 < x < 64$$

Ex

$$\log_5 x > 3$$

$$5^3 < x$$

$$x > 125$$

Logarithmic Equations--Equation with one or more logs

ex

$$\log_{100} x = -3/2$$

$$100^{-3/2} = x$$

$$\frac{1}{1000} = x$$

ex

$$\log_x \sqrt{5} = 3/2$$

$$(x^{1/2})^{3/2} = \sqrt{5}^{3/2}$$

$$x = (5^{1/2})^{3/5}$$

$$x = \sqrt[5]{5}$$

ex

$$\log_x 64 = 3$$

$$\sqrt[3]{x^3} = \sqrt[3]{64}$$

$$x = 4$$

ex

$$\log_x 3 = -2$$

$$(x^{-2})^k = 3^{-1/2}$$

$$x = \frac{1}{\sqrt{3}}$$

Rational
-1/2

$$x = \frac{\sqrt{3}}{3}$$

Do:

$$1. \log_x 27 = 3/4 \quad 81$$

$$2. \log_6 x = 3 \quad 216$$

$$3. \log_x 7 = 1/2 \quad 49 \quad (x^{1/2})^2 = 7^2$$

$$x = 49$$

$$4. \log_x \sqrt{5} = 1/4 \quad 25$$

$$(x^{1/4})^4 = (5^{1/2})^4$$

$$\log_b x = \log_b y \text{ iff } x = y$$

ex

$$\log_3 (x+2) = \log_3 (2x)$$

$$x+2 = 2x$$

$$2 = x$$

ex
 $\log_{10}(3x - 4) < \log_{10}(x + 6)$

$$3x - 4 < x + 6$$

$$2x < 10$$

$$x < 5$$

Restrict

$$x + 6 > 0$$

$$x > -6$$

what you are taking the log of.

$$3x - 4 > 0$$

$$x > \frac{4}{3}$$

$$\frac{4}{3} < x < 5$$

Cannot take the log of negative or zero

ex
 $\log_4 x^2 = \log_4 (4x - 3)$

$$x^2 = 4x - 3$$

$$x^2 - 4x + 3 = 0$$

$$(x - 3)(x - 1) = 0$$

$$x = 3 \quad x = 1$$

$$\{1, 3\}$$

HW

p536

47-61 odd, 54, 62